Volcanic Aerosol
(continued)

PROCEDURES & ACTIVITY

Prelab discussion:

1. Introduce basic principles and ideas.

2. Ask: - What do you think happens to the emperature of the Earth if something blocks incoming solar radiation?
   - Do you think all volcanic eruptions can cause this to happen?
   - How can we find out?

3. All measurements given in this activity are estimates only. Make sure that students understand the difference between "facts" and educated guesses!

ACTIVITY & DISCUSSION

NOTE: The teacher should review the information on page 1 of this activity before class.

1. DATA & CALCULATIONS:

Students should fill in the data tables provided, using calculators if desired.

2. GRAPHING THE DATA:

A graph of the data should be constructed, with the independent variable (VEI) on the "x" axis and the dependent variable (change in temperature following the eruption) on the "y" axis. The y axis can be labeled in intervals of 0.1 to 0.2 degrees Celsius. If the graphign skills of your students are weak, you may choose to lead the creation of the class graph, on the chalkboard.

3. DISCUSSION I:

Ask, "Are there any obvious trends to be seen, looking at the graph as is? Can a conclusion be formed?" (No--the graph will look like a mess at this point--that's OK).

4. GRAPHING THE MEANS:

On the same graph fro part 2, plot the temperature change vs. the VEI (students should use a separate color for this, if possible).

5. DISCUSSION II:

Ask,"Now is there any trend?" (On average, the greater the VEI the more likely there is to be a temperature drop for the following year). "Can a conclusion be formed now?" Even though a trend is shown, lead students to understand that the results are somewhat ambiguous, and THERE IS NOT ENOUGH DATA TO FORM A DEFINITE CONCLUSION. The best one can do with it is to say, "One average, it looks as if bigger eruptions might lead to cooler temperatures, but we can't be sure."

6. EXTENSION:

Explain that the 1902 eruption of Mt. Pellee (martinique) killed an estimated 29,025 people and had a VEI of 4 or 5. The 1991 eruption of Mt. Pinatubo, Phillippines, had a VEI of 6 and killed an estimated 800 people. Each student should be required to provide one explanation of how this might be possible (alternatively, allow groups of students to create lists of possibilities). In summary, it should be clear that it is NOT possible to correlate VEI with fatalities, because of the range of other factors (population density, proximity to site of eruption with global cooling, one must realize that there are a range of factors which influence temperature, and may make results difficult to interpret. The use of satellites by NASA to collect data may help to resolve this question with more certainty.